Amendments to the claims:

This listing of claims will replace all prior versions, and listings, of claims in the application:

Listing of Claims:

Claim 1 (currently amended): A Mach-Zehnder device for use with an optical signal, said Mach-Zehnder device comprising:

a device input port and a device output port;

a substantially achromatic first coupling region optically connected to said device input port;

a substantially achromatic second coupling region optically connected to said device output port; an intermediate region optically connected to both said first and second coupling regions, said intermediate region including a first intermediate branch and a second intermediate branch, said first intermediate branch defining a phase shifting portion, said phase shifting portion defining a phase shifting portion level of birefringence over the length of said phase shifting portion, said phase shifting portion level of birefringence being different ~~then~~ than an intermediate branch reference portion level of birefringence prevailing over at least an intermediate branch reference portion part of the remainder of said first intermediate branch [[.]] , so as to allow for the splitting of the optical signal into two orthogonal linearly polarized signals.

2. (currently amended) A Mach-Zehnder device as recited in claim 1 wherein said phase shifting portion level of birefringence is different ~~then~~ than the level of birefringence of the remainder of said first intermediate branch.

3. (currently amended) A Mach-Zehnder device as recited in claim 2 wherein said phase shifting portion level of birefringence is different ~~then~~ than the level of birefringence of said second intermediate branch.

4. (currently amended) A Mach-Zehnder device as recited in claim 1 wherein said phase shifting portion level of birefringence is higher ~~then~~ <u>than</u> said intermediate branch reference portion level of birefringence.

5. (original) A Mach-Zehnder device as recited in claim 4 wherein said phase shifting portion is made out of a phase shifting segment of polarization maintaining fiber.

6. (original) A Mach-Zehnder device as recited in claim 5 wherein said phase shifting segment of polarization maintaining fiber defines a phase shifting segment length, said phase shifting segment length having a value substantially in the range of one half of a beat length.

7. (currently amended) A Mach-Zehnder device as recited in claim ~~5~~ <u>1</u> wherein said first and second coupling regions ~~are made~~ <u>consist</u> of first and second fibers fused together, said first and second fibers having different propagation constant about said first and second coupling regions so as to define a coupling region propagation constant differential.

8. (original) A Mach-Zehnder device as recited in claim 7 wherein said propagation constant differential results from a difference in diameter between said first and second fibers about said first and second coupling regions.

9. (original) A Mach-Zehnder device as recited in claim 1 wherein

said phase shifting portion defines a phase shifting portion fast polarization axis;

said Mach-Zehnder device further including a polarization orienting means optically connected to said input port for ensuring that when said optical signal reaches said input port, said optical signal is linearly polarized and defines a signal fast polarization axis substantially aligned with said phase shifting portion fast polarization axis.

10. (original) A Mach-Zehnder device as recited in claim 9 wherein said polarization orienting means includes a polarization orienting segment of polarization maintaining fiber, said polarization orienting segment of polarization maintaining fiber defining a polarization orienting segment fast polarization axis substantially aligned with said phase shifting portion fast polarization axis.

11. (currently amended) A Mach-Zehnder device for use with an optical signal, said Mach-Zehnder device comprising:

a first main fiber, said first main fiber defining a first fiber input segment, said first fiber

input segment being optically connected to a first fiber first coupling segment, said first fiber first coupling segment being optically connected to a first intermediate branch, said first intermediate branch being optically connected to a first fiber second coupling segment, said first fiber second coupling segment being optically coupled to a first fiber output segment;

a second main fiber, said second main fiber defining a second fiber input segment, said second fiber input segment being optically connected to a second fiber first coupling segment, said second fiber first coupling segment being optically connected to a second intermediate branch, said second intermediate branch being optically connected to a second fiber second coupling segment, said second fiber second coupling segment being optically coupled to a second fiber output segment; said first fiber first coupling segment and said second fiber first coupling segment being optically coupled to one another so as to form a first coupling region; said first fiber second coupling segment and said second fiber second coupling segment being optically coupled to one another so as to form a second coupling region; said first intermediate branch defining a phase shifting portion, said phase shifting portion including a phase shifting segment of polarization maintaining fiber, said phase shifting portion defining a phase shifting portion level of birefringence over the length of said phase shifting portion, said phase shifting portion level of birefringence being different ~~then~~ <u>than</u> an intermediate branch reference portion level of birefringence prevailing over at least an intermediate branch reference portion part of the remainder of said first intermediate branch [[.]] <u>, so as to allow for the splitting of the optical signal into two orthogonal linearly polarized signals.</u>

12. (original) A Mach-Zehnder device as recited in claim 11 wherein said phase shifting segment of polarization maintaining fiber defines a phase shifting segment length, said phase shifting segment length having a value substantially in the range of one half of a beat length.

13. (currently amended) A Mach-Zehnder device as recited in claim 11 wherein said first and second fibers ~~are~~ <u>consist of fibers</u> fused together about one of said first or second coupling regions.

14. (original) A Mach-Zehnder device as recited in claim 11 wherein either one of said first or second coupling regions is substantially achromatic.

15. (currently amended) A Mach-Zehnder device as recited in claim 11 wherein said second

main fiber and a remaining segment of said first main fiber other ~~then~~ than said phase shifting segment are made of a single mode fiber.

16. (original) A method for forming a Mach-Zehnder device using a first and a second main fiber, said Mach-Zehnder device being intended for use with an optical signal splittable into first and second split signals each having respective fast and slow polarization components, said first and second main fibers respectively defining first and second fiber input segments, first and second fiber first coupling segments, first and second fiber intermediate segments, first and second fiber second coupling segments and first and second fiber output segments, said first and second fiber intermediate segments being adapted to respectively transmit first and second split signals, said method comprising the steps of:

splicing a phase shifting segment of relatively highly birefringent fiber in said first fiber intermediate segment between said first fiber first and second coupling segments, said phase shifting segment being calibrated so as to create a polarization selective phase shift between fast and slow polarization components of said first split signal;

juxtaposing said first fiber first and second coupling segments respectively with said second fiber first and second coupling segments so as to respectively form first and second device coupling regions.

17. (original) A method as recited in claim 16 further comprising the step of splicing an input segment of relatively highly birefringent fiber to one of said first or second fiber input segments, the polarization axes of said input segment of relatively highly birefringent fiber being substantially aligned with the polarization axes of said phase shifting segment of relatively highly birefringent fiber.

18. (original) A method as recited in claim 16 further comprising the step of splicing an input segment of relatively highly birefringent fiber to both said first and second fiber input segments, the polarization axes of one of said input segments of relatively highly birefringent fiber being substantially aligned with the polarization axes of said phase shifting segment of relatively highly birefringent fiber and the polarization axes of the other one of said input segments of relatively highly birefringent fiber being substantially perpendicular relative to the polarization axes of said phase shifting segment of relatively highly birefringent fiber.

19. (original) A method as recited in claim 16 further comprising the step of splicing an output segment of relatively highly birefringent fiber to one of said first or second fiber output segments, the polarization axes of said output segment of relatively highly birefringent fiber being substantially aligned with the polarization axes of said phase shifting segment of relatively highly birefringent fiber.

20. (original) A method as recited in claim 16 further comprising the step of fusing together and drawing the juxtaposed first and second first coupling segments so as to form fused-drawn first and second device coupling regions.

21. (original) A method as recited in claim 16 wherein one of said first or second fiber first or second coupling segments is tapered prior to juxtaposition with a corresponding first or second fiber first or second coupling segments so as to create an asymmetry between the juxtaposed segments and allow for the creation of relatively achromatic coupling region.

22. (original) A method as recited in claim 16 further comprising the step of calibrating the optical properties of said second fiber intermediate segment so that when said second split signal reaches said second coupling region said second split signal is substantially in phase with one of the polarization components of said first split signal.

23. (currently amended) A method as recited in claim 22 wherein the optical properties of said second fiber intermediate segment are calibrated by an Ultra-Violet ~~synthonization~~ syntonisation process.

24. (currently amended) A phase shifting device for substantially achromatically modifying the phase of a first optical signal relative to the phase of a second optical signal, said first optical signal defining a first signal fast polarization axis and a first signal slow polarization axis, said second optical signal defining a second signal fast polarization axis and a second signal slow polarization axis, said phase shifting device comprising:

a first optical path having a first birefringence level, said first optical path defining a first path input and a first path output;

a second optical path having a second birefringence level substantially similar to said first birefringence level, said second optical path defining a second path input and a second path output;

said first optical path being provided with a phase shifting segment made out of a polarization maintaining fiber having a phase shifting birefringence level relatively different ~~then~~ than said first and second birefringence levels, said phase shifting segment defining a phase shifting segment fast polarization axis and a phase shifting segment slow polarization axis, said phase shifting segment being calibrated so as to cause a predetermined phase delay between said first signal fast polarization axis and said first signal slow polarization axis so as to defined a delayed and an non-delayed first signal;

said second optical path being calibrated so as to propagate said second signal fast polarization axis substantially in phase with said second signal slow polarization axis and with said non-delayed first signal

the difference in birefringence level between said phase shifting birefringence level and said first and second birefringence levels defining a birefringence differential, said birefringence differential being calibrated such that when said first optical signal is propagated in said first optical path and said second optical signal is simultaneously propagated in said second optical path, said birefringence differential creates a polarization selective phase shift between said first optical signal and said second optical signal.

25. (original) An antipodal phase generator as recited in claim 24 wherein said phase shifting segment is calibrated so that said phase delay occurs over one half of a beat length.

26. (original) An antipodal phase generator as recited in claim 24 further comprising

a polarization alignment means optically connected to said first optical path intermediate said first path input and said phase shifting segment for substantially aligning said first signal fast polarization axis and said first signal slow polarization axis respectively with said phase shifting segment fast polarization axis and said phase shifting segment slow polarization axis.

27. (currently amended) An optical device for transmitting a first optical signal and a second optical signal, said optical device comprising:

a first optical path, said first optical path defining a first optical path input port and an opposed first optical path output port, said first optical path being provided with a phase shifting segment optically connected between said first optical path input port and said first optical path output port, said phase shifting segment being made out of a polarization maintaining fiber and

having a phase shifting birefringence level, the remainder of said first optical path having a reference birefringence level, said phase shifting birefringence level being different ~~then~~ <u>than</u> said reference birefringence level;

a second optical path, said second optical path defining a second optical path input port and an opposed second optical path output port, said second optical path having a second birefringence level;

the difference in birefringence level between said phase shifting birefringence level and said reference birefringence level defining a birefringence differential, said birefringence differential being calibrated such that when said first optical signal is propagated in said first optical path and said second optical signal is simultaneously propagated in said second optical path, said birefringence differential creates a polarization selective phase shift between said first optical signal and said second optical signal.